

We claim:

1. A retroviral vector which is capable of undergoing promoter conversion comprising a 5' long terminal repeat region of the structure U3-R-U5; one or more sequences selected from coding and non-coding sequences; and a 3' long terminal repeat region comprising a completely or partially deleted U3 region wherein said deleted U3 region is replaced by a polylinker sequence, followed by the R and U5 region.
2. The retroviral vector according to Claim 1 wherein the 3' long terminal repeat region comprises a completely deleted U3 region.
3. The retroviral vector according to Claim 1, wherein said polylinker sequence comprises at least one unique restriction site.
4. The retroviral vector according to Claim 3, wherein said polylinker sequence comprises at least one insertion of a heterologous DNA fragment.
5. The retroviral vector according to Claim 4, wherein said heterologous DNA fragment is selected from one or more elements of the group consisting of regulatory elements and promoters.
6. The retroviral vector according to Claim 5, wherein said regulatory elements and promoters are target cell specific in their expression.

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5 7. The retroviral vector according to Claim 6, wherein said target cell specific regulatory elements and promoters are selected from one or more elements of the group consisting of Whey Acidic Protein specific regulatory elements and promoters, Mouse Mammary Tumor Virus specific regulatory elements and promoters, β -lactoglobulin and casein specific regulatory elements and promoters, pancreas specific regulatory elements and promoters, lymphocyte specific regulatory elements and promoters and Mouse Mammary Tumor Virus specific regulatory elements and promoters conferring responsiveness to glucocorticoid hormones or directing expression to the mammary gland.

15 8. The retroviral vector according to Claim 5, wherein said regulatory elements and promoters regulate the expression of at least one of the coding sequences of said retroviral vector.

20 9. The retroviral vector according to Claim 1, wherein each long terminal repeat region is selected from at least one element of the group consisting of a long terminal repeat region of Murine Leukaemia Virus, Mouse Mammary Tumor Virus, Murine Sarcoma Virus, Simian Immunodeficiency Virus, Human Immunodeficiency Virus, Human T Cell Leukaemia Virus, Feline
25 Immunodeficiency Virus, Feline Leukaemia Virus, Bovine Leukaemia Virus, and Mason-Pfizer-Monkey Virus.

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10. The retroviral vector according to Claim 1, wherein said retroviral vector is based on a BAG vector.

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5 11. The retroviral vector according to Claim 1, wherein said coding sequence is selected from one or more elements of the group consisting of marker genes, therapeutic genes, antiviral genes, antitumor genes, and cytokine genes.

Sub B 12. The retroviral vector according to Claim 11, wherein said marker or therapeutic gene is selected from one or more elements of the group consisting of β -galactosidase gene, neomycin gene, Herpes Simplex Virus thymidine kinase gene, puromycin gene, cytosine deaminase gene, hygromycin gene, secreted alkaline phosphatase gene, guanine phosphoribosyl transferase (gpt) gene, alcohol dehydrogenase gene and hypoxanthine phosphoribosyl transferase (HPRT) gene.

15 13. The retroviral vector according to Claim 1, wherein at least one of said coding sequences for a retroviral protein is altered or at least partially deleted.

20 14. The retroviral vector according to Claim 1, wherein retroviral sequences involved in integration of retroviruses are altered or at least partially deleted.

Sub B6 15. The retroviral vector according to Claim 4, wherein said heterologous DNA fragment is homologous to one or more cellular sequences or a part thereof.

25 16. The retroviral vector according to Claim 5, wherein said regulatory elements are regulatable by transacting molecules.

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17. A retroviral vector system comprising:
a retroviral vector which is capable of undergoing promoter conversion comprising a 5' long terminal repeat region of the structure U3-R-U5; one or more sequences selected from coding and non-coding sequences; and a 3' long terminal repeat region comprising a completely or partially deleted U3 region wherein said deleted U3 region is replaced by a polylinker comprising regulatory sequences, followed by the R and U5 region; and

a packaging cell line harboring at least one retroviral or recombinant retroviral construct coding for proteins required for said retroviral vector to be packaged.

15 18. The retroviral vector system according to Claim 17
wherein the packaging cell line harbors retroviral or
recombinant retroviral constructs coding for those
retroviral proteins which are not encoded in said
retroviral vector.

19. The retroviral vector system according to Claim 17
wherein the packaging cell line is selected from the
group consisting of psi-2, psi-Crypt, psi-AM, GP+E-86,
PA317 and GP+envAM-12.

20. A method for introducing homologous or heterologous
nucleotide sequences into target human or animal cell
populations *in vitro* and *in vivo* comprising infecting
the target cell population with recombinant
retroviruses produced by the retroviral vector system
of Claim 17.

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21. The method according to Claim 20, wherein the nucleotide sequences are selected from one or more elements of the group consisting of genes or parts of genes encoding for proteins, regulatory sequences and promoters.
22. Recombinant retroviral particle obtained by transfecting a packaging cell line of a retroviral vector system according to Claim 17 with the retroviral vector according to Claim 17, and culturing the cells under suitable conditions.
23. A retroviral provirus produced by infection of target cells with a recombinant retroviral particle according to Claim 22 whereby the polylinker in the 3' long terminal repeat becomes duplicated during the process of reverse transcription in the target cell and appears in the 5' long terminal repeat as well as in the 3' long terminal repeat of the resulting provirus.
24. mRNA of the retroviral provirus according to Claim 23.
25. RNA of a retroviral vector according to Claim 1.
26. Pharmaceutical composition containing a therapeutically effective amount of a recombinant retroviral particle according to Claim 22.
27. A method for introducing homologous or heterologous nucleotide sequences into target human or animal cell populations *in vitro* and *in vivo* comprising infecting the target cell population with the recombinant retrovirus particle of Claim 22.

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